

CLAIMS

What is claimed is:

1. A method for decreasing the ratio of liquiritigenin-derived isoflavones relative to total isoflavone levels in an isoflavonoid-producing plant the method comprising:

- a) transforming a plant cell with a recombinant construct comprising a promoter operably linked to a nucleic acid sequence of at least 200 nucleotides having at least 75% sequence identity to SEQ ID NO:4;
- b) regenerating a transformed plant from the transformed plant cell of (a); and
- c) evaluating the transformed plant obtained from step (b) for a reduced ratio of liquiritigenin-derived isoflavones relative to total isoflavone levels as compared to the ratio of liquiritigenin-derived isoflavones relative to total isoflavone levels in an untransformed plant.

2. The method of Claim 1 wherein the promoter is operably linked, in a sense orientation, to the nucleic acid sequence.

3. The method of Claim 1 wherein the promoter is operably linked, in an anti-sense orientation, to the nucleic acid sequence.

4. The method of Claim 1 wherein the recombinant construct comprises a stem-loop structure.

5. The method of Claim 4 wherein the nucleic acid sequence forms a stem in the stem-loop structure.

6. The method of Claim 4 wherein the nucleic acid sequence forms a loop in the stem-loop structure.

7. The method of Claim 4 wherein the nucleic acid sequence forms a loop in the stem-loop structure and the stem consists essentially of SEQ ID NO:7.

8. The method of Claim 1 wherein the promoter is a seed-specific promoter.

9. The method of Claim 1 wherein the isoflavonoid-producing plant is selected from the group consisting of soybean, clover, mung bean, lentil, hairy vetch, alfalfa, lupine, sugar beet, and snow pea.

10. An isoflavonoid-producing plant made by the method of any of Claims 1 to 8 wherein the plant has a reduced ratio of liquiritigenin-derived isoflavones relative to total isoflavone levels as compared to the ratio of liquiritigenin-derived isoflavones relative to total isoflavone levels in an untransformed plant.

11. The isoflavonoid-producing plant of Claim 9 wherein the plant is selected from the group consisting of soybean, clover, mung bean, lentil, hairy vetch, alfalfa, lupine, sugar beet, and snow pea.

12. Seeds or plant parts of the plant of Claim 11.

13. An isoflavonoid-containing product having a reduced ratio of liquiritigenin-derived isoflavones relative to total isoflavone levels obtained from the seeds or plant parts of Claim 12.

14. The isoflavonoid-containing product of Claim 13 wherein the product is selected from the group consisting of protein isolate, protein concentrate, meal, grits, full fat and defatted flours, textured proteins, textured flours, textured concentrates, and textured isolates.

15. A food which has incorporated therein the isoflavonoid-containing product of Claim 13.

16. A nutritional supplement which has incorporated therein the isoflavonoid-containing product of Claim 13.

17. A food bar which has incorporated therein the isoflavonoid-containing product of Claim 13.

18. A beverage which has incorporated therein the isoflavonoid-containing product of Claim 13.

19. An isoflavonoid-containing protein product having a reduced ratio of liquiritigenin-derived isoflavones relative to a total isoflavone level obtained from the seeds of Claim 12 wherein the seeds are soybean seeds.

20. The isoflavonoid-containing protein product of Claim 19 wherein the isoflavonoid product is selected from the group consisting of protein isolate, protein concentrate, meal, grits, full fat and defatted flours, textured proteins, textured flours, textured concentrates, textured isolates, soymilk, tofu, fermented soy products, and whole bean soy products.

21. An isoflavonoid-producing plant comprising in its genome a recombinant construct comprising a promoter operably linked to a nucleic acid sequence of at least 200 nucleotides and having at least 75% sequence identity to SEQ ID NO:4 wherein the plant has a reduced ratio of liquiritigenin-derived isoflavones relative to total isoflavone levels as compared to the ratio of liquiritigenin-derived isoflavones relative to total isoflavone levels in an untransformed plant.

22. The isoflavonoid-producing plant of Claim 21 wherein the plant is selected from the group consisting of soybean, clover, mung bean, lentil, hairy vetch, alfalfa, lupine, sugar beet, and snow pea.

23. The plant of Claim 22 wherein recombinant construct comprises a promoter operably linked, in sense orientation, to the nucleic acid sequence.

24. The plant of Claim 22 wherein recombinant construct comprises a promoter operably linked, in an anti-sense orientation, to the nucleic acid sequence.

5 25 The plant of Claim 22 wherein the recombinant construct comprises a stem-loop structure.

26. The plant of Claim 22 wherein the recombinant construct comprises a stem-loop structure in which the nucleic acid sequence forms the stem.

10 27. The plant of Claim 22 the recombinant construct comprises a stem-loop structure in which the nucleic acid sequence forms the loop.

28. The plant of Claim 22 wherein the recombinant construct comprises a stem-loop structure in which the nucleic acid sequence forms the loop in the stem-loop structure and the stem consists essentially of SEQ ID NO:7.

15 29. The plant of Claim 22 wherein the recombinant construct comprises a seed-specific promoter.

30. Seeds or plant parts of the plant of any of Claims 22-29.

31. An isoflavonoid-containing product having a reduced ratio of liquiritigenin-derived isoflavones relative to total isoflavone levels obtained from the seeds or plant parts of Claim 30.

20 32. The isoflavonoid-containing product of Claim 31 wherein the product is selected from the group consisting of protein isolate, protein concentrate, meal, grits, full fat and defatted flours, textured proteins, textured flours, textured concentrates, and textured isolates.

25 33. A food which has incorporated therein the isoflavonoid-containing product of Claim 31.

34. A nutritional supplement which has incorporated therein the isoflavonoid-containing product of Claim 31.

35 35. A food bar which has incorporated therein the isoflavonoid-containing product of Claim 31.

30 36. A beverage which has incorporated therein the isoflavonoid-containing product of Claim 31.

37. An isoflavone-containing protein product having a reduced ratio of liquiritigenin-derived isoflavones relative to total isoflavone levels obtained from the seeds of Claim 31 wherein the seeds are soybean seeds.

35 38. The isoflavonoid-containing protein product of Claim 31 wherein the isoflavonoid product is selected from the group consisting of protein isolate, protein concentrate, meal, grits, full fat and defatted flours, textured proteins, textured

flours, textured concentrates, textured isolates, soymilk, tofu, fermented soy products, and whole bean soy products.

39. A method of producing an isoflavonoid-containing product having a reduced ratio of liquiritigenin-derived isoflavones relative to total isoflavone levels which comprises:

- (a) cracking the seeds of Claim 12 or Claim 30 to remove the meats from the hulls; and
- (b) flaking the meats obtained in step (a) to obtain the desired flake thickness.

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